Name:

at1121exam_practice: Radicals and Squares (v604)

Question 1

Simplify the radical expressions.

$\sqrt{99}$ $\sqrt{8}$ $\sqrt{44}$

$\sqrt{3 \cdot 3 \cdot 11}$ $\sqrt{2 \cdot 2 \cdot 2}$ $\sqrt{2 \cdot 2 \cdot 11}$

$3\sqrt{11}$ $2\sqrt{2}$ $2\sqrt{11}$

Question 2

Find all solutions to the equation below:

$$3(x+10)^2 - 4 \;=\; 71$$

First, add 4 to both sides.

$$3(x+10)^2 = 75$$

Then, divide both sides by 3.

$$(x+10)^2 = 25$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 10 = \pm 5$$

Subtract 10 from both sides.

$$x = -10 \pm 5$$

So the two solutions are $x = -5$ and $x = -15$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 6x = 91$$

$$x^2 - 6x + 9 = 91 + 9$$
$$x^2 - 6x + 9 = 100$$
$$(x-3)^2 = 100$$
$$x - 3 = \pm 10$$
$$x = 3 \pm 10$$
$$x = 13 \quad \text{or} \quad x = -7$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y = 3x^2 + 24x + 54$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 + 8x) + 54$$

We want a perfect square. Halve 8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 + 8x + 16 - 16) + 54$$

Factor the perfect-square trinomial.

$$y = 3((x+4)^2 - 16) + 54$$

Distribute the 3.

$$y = 3(x+4)^2 - 48 + 54$$

Combine the constants to get **vertex form**:

$$y = 3(x+4)^2 + 6$$

The vertex is at point $(-4, 6)$.